QUANTIFYING THE CORRELATION BETWEEN EYE-MOVEMENT AND PERCEPTUAL RESPONSES TO MOVING PLAIDS. ((Brent R. Beutter, and Leland S. Stone)), NASA Ames Research Center, Moffett Field, CA 94035.

Purpose. To determine the extent to which the pursuit eye-movement and perceptual systems share a common neural motion-processing pathway, we simultaneously measure the pyschophysical and eye-movement responses to drifting plaids in a direction-discrimination task. Correlation between the noise in the eye movements and percepts would suggest a shared neural substrate. **Methods.** Three observers were asked to track a plaid (Type I 90°; TF = 4 Hz, SF = 0.6 c/d; direction = -2, 0, or 2°), and to respond whether the motion was to the right or left of vertical. The eye-movement direction is computed from the initial 300 ms of saccade-free tracking (near open-loop). On each trial, we use the eye-movement direction to predict the perceptual response. We then compute the probability of successfully predicting the observer's response. We also use SOC analysis (Newsome et al. 1990) as an alternate measure of the correlation. We compare the data from both these analyses to the predictions of two models in which the eye movements and the percept are driven by either a common noisy signal (correlated model) or by two seperate noisy signals (uncorrelated model). We also allow for the fact that our measured eye movements are degraded by eye-tracker noise. This noise causes our measured correlation to be lower than the actual biological correlation. **Results.** The correlations in our data are higher than those predicted by the uncorrelated model, and are similar to the predictions of the correlated model. The proportion of perceptual responses correctly predicted by the eye movements were 0.66, 0.60, 0.73 for the -2, 0, 2° stimuli respectively (correlated model 0.65, 0.60, 0.70; uncorrelated model 0.58, 0.51, 0.60).The SOC proportions were 0.71, 0.64, 0.72 (correlated model 0.66, 0.64, 0.69; uncorrelated model 0.5, 0.5, 0.5). **Conclusions.** These results show that the oculomotor and perceptual system share a performance-limiting noise source and provide strong evidence that a common neural mechanism (perhaps MT or MST) drives both perception and smooth eye movements.

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